User's Manual

Model ISC40G(S)

Sensors and Fittings for Inductive Conductivity Measurement

YOKOGAWA

IM 12D8J2-E-E
15th edition

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1 INTRODUCTION

1.1 General

The sensor and fitting program for inductive conductivity measurement (model ISC40) is designed to meet the most common installation requirements in terms of material compatibility, process connections and flow dynamics. The various installation possibilities are described and illustrated in this manual.
The following categories of installation can be recognised:

1. Direct mounting of sensors in tank wall or customer supplied flanges
2. Cost effective installation of sensors using process adapters
3. Maintenance friendly installation of sensors using in-line subassemblies
4. Installation in flow chambers for measurements in sample streams or bypass loops
5. Installation in immersion fittings for measurement in open tanks or channels

Within the wide range of process adapters, subassemblies, flow fittings and immersion fittings it is easy to find the appropriate installation that fits the application (a wide choice of materials), the plant installation practice (a wide choice of process connections) and the maintenance procedures.

1.2 Unpacking and Checking

Upon delivery, unpack the sensor carefully and inspect it to ensure that it is not damaged during shipment. If damage is found, retain the original packing material and immediately notify the carrier and the relevant local Yokogawa Sales office.
Make sure the Model Code and Serial Number on the sensor are the same as on the packing list. Also check if option(s) that were ordered, are included and correct.

1.3 Warranty and Service

Yokogawa products are guaranteed free from defects in workmanship and materials under normal use and service for a period of (typically) 12 months from the date of shipment from the manufacturer. Individual Sales organizations can deviate from the typical warranty period, and the conditions of sale relating to the original purchase order should be consulted. Damage caused by wear and tear, inadequate maintenance, corrosion, or by the effects of chemical processes is excluded from this warranty coverage. In the event of a warranty claim, the defective goods should be sent (freight paid) to the Service Department of the relevant Yokogawa Sales office for repair or replacement (at Yokogawa's discretion).

The following information must be included in the letter accompanying the returned goods:

- Model Code and Serial Number.
- Original Purchase Order and Date.
- Length of time in service and description of the process.
- Description of the fault and circumstances of the failure.
- Process/environmental conditions that may be related to the failure of the sensor.
- Statement as to whether warranty or non-warranty service is requested.
- Complete shipping and billing instructions for return of material, plus the name and phone number of a contact person that can be reached for further information.
- Clean Statement
  Returned goods that have been in contact with process fluids must be decontaminated and disinfected prior to shipment. Goods should carry a certificate to this effect, for the health and safety of our employees. Material Safety Data sheets must be included for all components of the process to which the sensor(options) have been exposed.

1.4 Serial Number definition

The Serial Number is defined by nine (9) alphanumeric characters:

X_1X_2	Production Location
X_3X_4	Year/Month code
X_5X_6 X_7X_8 X_9	Tracking number

Example: N1B600028

Table 1:
Production year according to DIN. IEC 60062

Year	Yearcode	Year	Yearcode
2012	C	2024	S
2013	D	2025	T
2014	E	2026	U
2015	F	2027	V
2016	H	2028	W
2017	J	2029	X
2018	K	2030	A
2019	L	2031	B
2020	M	2032	C
2021	N	2033	D
2022	P	2034	E
2023	R	2035	F

Table 2:
Production month code according to DIN. IEC 60062

Month	Monthcode
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	O
November	N
December	D

2 GENERAL SPECIFICATIONS

The ISC40 inductive conductivity sensor is suitable for use with the Yokogawa inductive conductivity analyzers.

2.1 Measuring elements

: Toroïds with high permeability magnetic material
Pt1000 or 30k temperature element

2.2 Materials

Wetted parts sensor

Body ISC40*-G* : 30% glass filled PEEK, FDA approved
Body ISC40*-T* : PFA, FDA approved

Non-wetted parts sensor

Sealing gasket : Viton
Thread part : AISI 316 SS

Options for sensor

All options except /TFD: AISI 316 SS and O-ring material as wetted part
/TFD : AISI 316 SS as non-wetted part
TFM and Kalrez as wetted part

2.3 Functional specifications (at 25°C)

Temperature element : Pt1000 to IEC 751
30k NTC

Installation factor : 1.88 cm-1 nominal for PEEK sensor
3.00 cm-1 nominal for PFA sensor
Actual installation can change this factor.
If there is less than 25mm spacing between sensor and holder, in-situ calibration is necessary to meet the specified accuracies (see fig. 1)

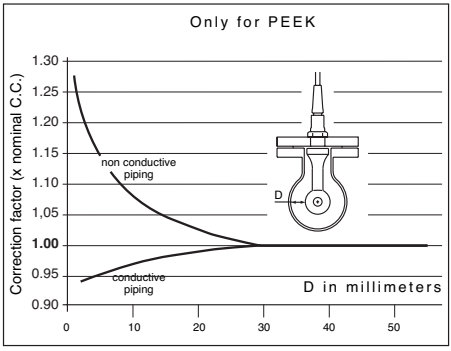


Fig 1: Actual installation factor as function of spacing around the sensor

Note: The ISC40 temperature sensor is designed for cell compensation and for indication. It is **NOT** designed for process temperature control.

2.4 Dynamic specifications

Response time : t_{90} < 5 min. for PEEK sensor
conductivity t_{90} < 10 min. for PFA sensor

2.5 Operating range

Conductivity : 0 – 2000 mS/cm at actual process temperature.

Note: The sensor has an error (0.5 µS/cm for PEEK model, 1.0 µS/cm for PFA model) that must be considered when application is chosen.

Temperature : -20°C to 130°C (-4°F to 266°F) for PEEK sensor
-20°C to 100°C (-4°F to 212°F) for PFA sensor

Pressure : 0 to 20 bar (0 to 290 PSIG) for PEEK sensor
0 to 10 bar (0 to 145 PSIG) for PFA sensor.

Note: At maximum process temperature the maximum pressure for the PFA sensor is 5 bar (72 PSIG).

Cable length : max 50 meter, in combination with WF10 extension cable and BA10 junction box

2.6 Regulatory standards

CE : Decision 768/2008/EC

- ATEX : Directive 94/9/EC, as amended by Regulation (EC) no. 1882/2003

Certificate no. : DEKRA 11ATEX0063 X
Ⓔx II 1 G Ex ia IIC T4…T6 Ga

Electrical data : Sensor output circuits (permanently connected cable) connected to a certified intrinsically safe circuit with the following maximum values: Ui = 19.1 V; Ii = 170 mA; Pi = 0.8 W; Ci = 0 nF; Li = 0 mH
or
certified intrinsically safe Yokogawa Inductive Conductivity transmitter model FLXA21 series, model ISC202S series or model IC200S series

Note: The effective internal capacitance Ci and the effective internal inductance Li of the sensor are depending only upon the properties and the length of the connected cable.

Special conditions (X) : T6 for Tamb. -30°C to 40°C
T5 for Tamb. -30°C to 95°C
T4 for Tamb. -30°C to 130°C, depending on sensor body material

WARNING : The sensor must be installed and used so, that dangers of ignition due to hazardous electrostatic charges cannot occur, especially in the case that the process medium is non-conductive.

- Pressure : Directive 97/23/EC, as amended by Regulation (EC) no. 1882/2003

Applying article : 3.3 (Sound Engineering Practice)

IECEx

Applying standards : IEC 60079-0 : 2007
IEC 60079-11 : 2006
IEC 60079-26: 2006

Certificate no. : IECEx DEK 11.0028X
Ex ia IIC T4…T6 Ga

CSA

Certificate no.	: 2447837 IS, Class I Div. 1, GP A, B, C, D T4…T6 Master Contract no 182892
Electrical data	: Sensor output circuits (permanently connected cable) connected to a certified intrinsically safe circuit with the following maximum values: Uo = 19.1 V; Io = 170 mA; Po = 0.8 W; Co≥ Ci + Ccable; Lo≥ Li + Lcable or certified intrinsically safe Yokogawa Inductive Conductivity transmitter model FLXA21 series, model ISC202S series or model IC200S series
Ambient temperature range	: T6 for Tamb. -30°C to 40°C T5 for Tamb. -30°C to 95°C T4 for Tamb. -30°C to 130°C, depending on sensor body material

Note: Intrinsically safe when connected as per Control Drawing FF1-K1244QY (see fig. 2)

FM

Certificate no.	: 3046320 IS, Class I, Div. 1, Groups A, B, C, D T4…T6
Electrical data	: Sensor output circuits (permanently connected cable) connected to a FM approved intrinsically safe apparatus meeting the entity parameters of the ISC40S: Uo≤ 19.1 V; Io≤ 170 mA; Po≤ 0.8 W; Co≥ Ci + Ccable; Lo≥ Li + Lcable or certified intrinsically safe Yokogawa Inductive Conductivity transmitter model FLXA21 series, model ISC202S series or model IC200S series
Ambient temperature range	: T6 for Tamb. -30°C to 40°C T5 for Tamb. -30°C to 85°C T4 for Tamb. -30°C to 85°C, depending on sensor body material

Note: Intrinsically safe when connected as per Control Drawing FF1-K1244QX (see fig. 3)

2.7 Shipping details

Package size (LxWxH)

ISC40*-**-*-03 (05) : 350 x 270 x 50 mm (13.8 x10.6 x 2.0 inch)

ISC40*-**-*-10 (15, 20): 320 x 240 x110 mm (12.6 x 9.5 x 4.3 inch)

Package weight (app.)

ISC40*-**-*-03 : 1.0 kg (2.2 lbs)

ISC40*-**-*-05 : 1.3 kg (2.9 lbs)

ISC40*-**-*-10 : 1.6 kg (3.5 lbs)

ISC40*-**-*-15 : 2.1 kg (4.6 lbs)

ISC40*-**-*-20 : 2.5 kg (5.5 lbs)

2.8 Environmental conditions

Storage temperature	: -30°C to 50°C (-22°F to 122°F)
Water proof	: IP67 (conform IEC 60529), also in combination with the preferred Yokogawa process connections

2.9 Process connections

Process connections are made in combination with a variety of adapters and fittings, which are available in AISI 316 SS, PVC or PVDF (see relevant sections in this manual).

Control Drawing CSA

The ISC40S sensor shall be installed with one of the Yokogawa transmitters model:
• ISC202S • IC200S • FLXA21
with following parameters:

	ISC202S	IC200S	FLXA21
Uo	14.4 V	19.1 V	11.76 V
Io	88 mA	162 mA	60.6 mA
Po	317 mW		178 mW
Lo	4.5 mH	800µH	8 mH
Co	600 nF	254nF	100 nF

or

To a CSA approved intrinsically safe apparatus meeting the entity parameters of the ISC40S: Uo ≤ 19.1V
Io ≤ 170mA
Po ≤ 0.8W
Co ≥ Ci + C(cable)
Lo ≥ Li + L(cable)

The effective inductive capacitance Ci and the effective induced inductance Li of the sensor depends only upon the properties and the length of the connected cable (max 50m).

When installing this equipment, follow the manufacturer's control drawing. Installing should be in accordance with Canadian Electrical Code Part 1 or CEC Part1.

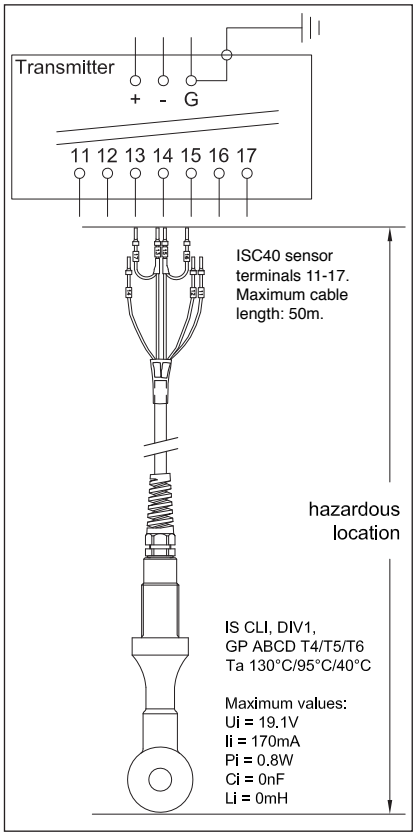


Fig 2: FF1-K1244QY Control Drawing CSA

Warning: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or read, understand and adhere to the manufacturer's live maintenance procedures.

ISC40- □ - □ - □
- □ Cable length
  in meters, any number between 1 and 50 meters
- □ Temperature Element
  - T1 PT1000
  - T3 30k thermistor
- □ Plastic and adaption code
  - GG Glass filled PEEK, general model
  - GR Glass filled PEEK, retractable model
  - GS Glass filled PEEK, shaft model
  - TG PFA, general model

Control Drawing FM

The ISC40S sensor shall be installed with one of the Yokogawa transmitters model:
• ISC202S • IC200S • FLXA21
with following parameters:

	ISC202S	IC200S	FLXA21
Uo	14.4 V	19.1 V	11.76 V
Io	88 mA	162 mA	60.6 mA
Po	317 mW		178 mW
Lo	4.5 mH	800µH	8 mH
Co	600 nF	254nF	100 nF

or
To a FM approved intrinsically safe apparatus meeting the entity parameters of the ISC40S: Uo ≤ 19.1V
Io ≤ 170mA
Po ≤ 0.8W
Co ≥ Ci + C(cable)
Lo ≥ Li + L(cable)

The effective inductive capacitance Ci and the effective induced inductance Li of the sensor depends only upon the properties and the length of the connected cable (max 50m).

When installing this equipment, follow the manufacturer's control drawing. Installing should be in accordance with ANSI/ISA RP 12.06.01 "Installation of Intrisically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70).

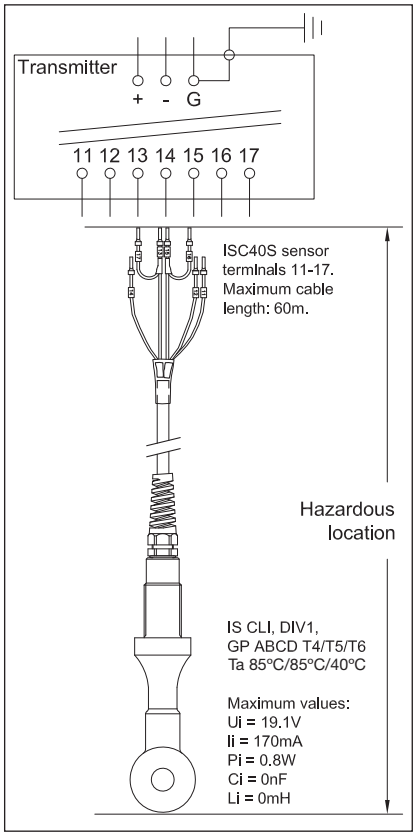


Fig 3: FF1-K1244QX Control Drawing FM

Warning: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing or read, understand and adhere to the manufacturer's live maintenance procedures.

ISC40- □ - □ - □
- □ Cable length
  - in meters, any number between 1 and 50 meters
- □ Temperature Element
  - T1 PT1000
  - T3 30k thermistor
- □ Plastic and adaption code
  - GG Glass filled PEEK, general model
  - GR Glass filled PEEK, retractable model
  - GS Glass filled PEEK, shaft model
  - TG PFA, general model

3 INSTALLATION OF SENSOR WITH STANDARD OPTIONS

For optimum measurement results, the ISC40 sensor should be installed in a location that offers an acceptable representation of the process composition and **DOES NOT** exceed the specifications of the sensor.

It is important that the process flow is directed through the hole in the donut of the sensor. For this reason the flats on the sensor top part have to be installed perpendicular on the process flow (see fig. 4).

The inductive conductivity measurement technique requires a process fluid surrounding the donut of the sensor. The installation factor mentioned on the label of the sensor cable will assure accurate conductivity measurement under the condition that the donut is surrounding by 25 mm (1") process fluid. If this condition cannot be met, the measurement loop (analyser in combination with sensor) has to be calibrated. Consult the instruction manuals of the analyser for details.

The mounting of the sensor in the process adapters is described in section 3.1. The mounting of the process adapters in the end-users application requires compatibility of materials and process connections.

3.1 Typical installation

3.1.1 Installation of ISC40G(S)-GG (TG) with flange adapters

The ISC40G(S)-GG (TG) sensor is supplied with a flat Viton sealing gasket for compatibility with existing installations. When using the sensor in combination with the new fittings, which are improved by the addition of O-ring seals (see figure 6), the flat Viton gasket should be discarded.

It is important that the access port has a diameter of at least 50 mm (2") to allow insertion of the donut shaped end of the sensor. For more detailed dimensions of the sensor see paragraph 4.

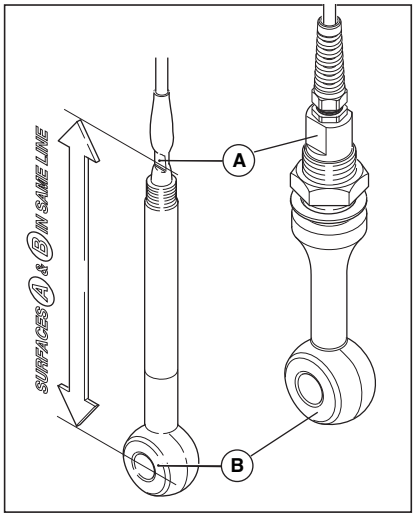


Fig 4: Aligning of sensor donut (B) and flats (A)

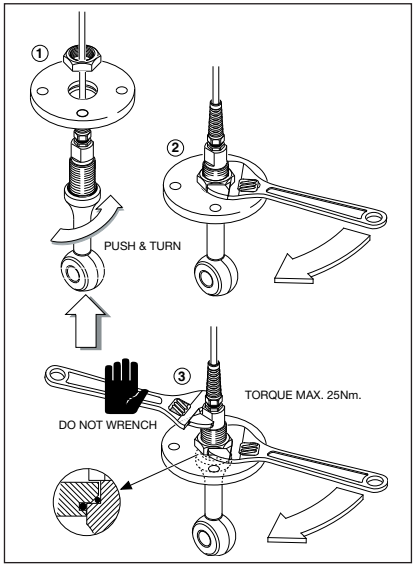


Fig 5: Mounting Procedure ISC40G(S)-GG (TG) with flange adapters

Note: When a torque of more than 25 Nm is applied, the top part of the body of the PFA sensor will be damaged (TG model)

The sensor cable and mounting thread are pulled through the hole of the flange, and the sensor is sealed from the process by tightening the mounting nut. Turning of the sensor by the torque forces can be avoided by using a wrench on the flats on top of the sensor (see fig. 5). Sensor is installed correctly if the flats are aligned perpendicular on the process flow.

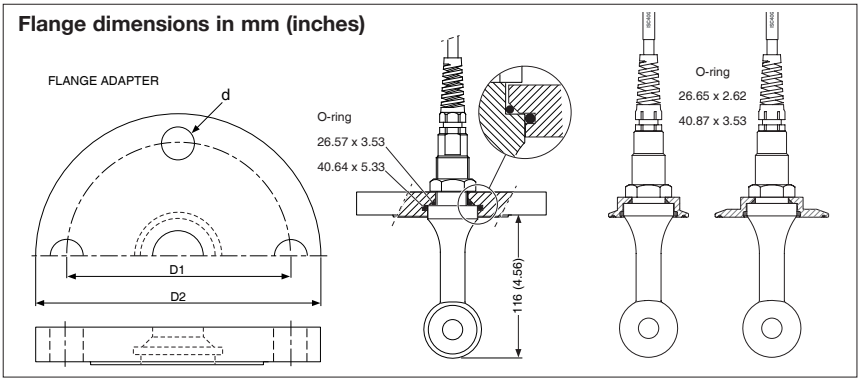


Fig 6: Option /SFA, /SFD, /S2W, /STW

Option	d	D1	D2
/SFA	Ø19 (0.75)	121 (4.76)	152 (6.0)
/SFD	Ø18 (0.71)	125 (4.92)	165 (6.5)
/TFD	Ø18 (0.71)	145 (5.71)	185 (7.3)

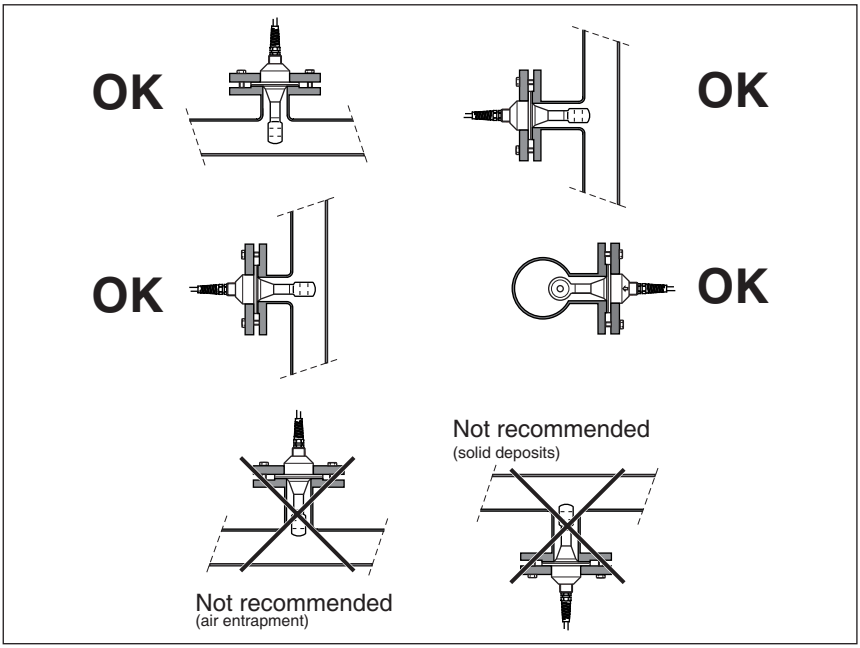


Fig 7: Installation examples

3.1.2 Installation of ISC40G(S)-TG with T-piece

The ISC40G(S)-TG sensor is a PFA sensor which can be used in combination with a T-piece of which the innerside is lined with PFA. This can be done using option /TFD (sealing material with stainless steel DN65 PN10 flange), or by option /TFN (sealing material) if the stainless steel flange DN65 PN10 is already available. Both options are available as sparepart.

Note: If sensor is replaced, you have to use new sealing materials (part no. K1541XG) to prevent process leakage.

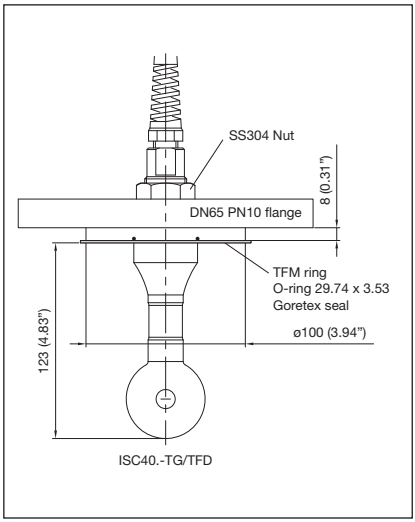
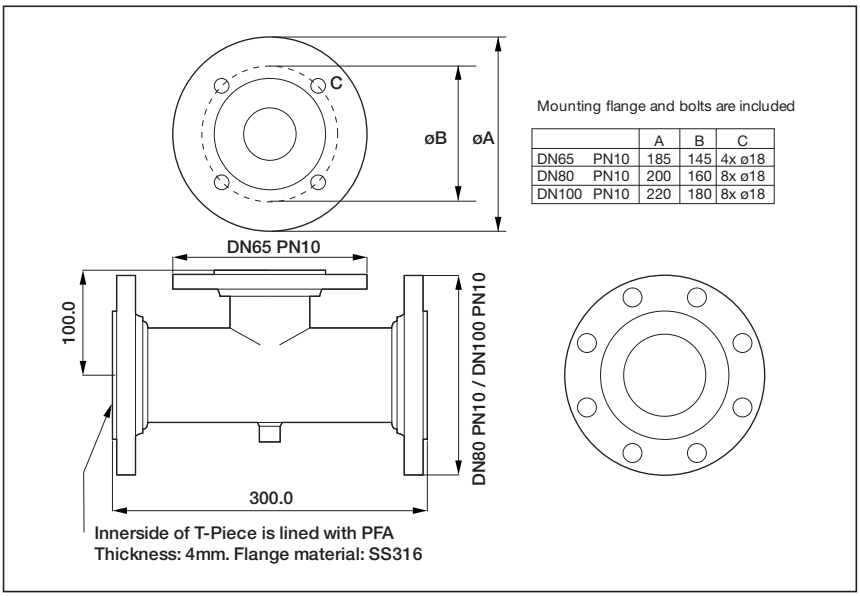


Fig 8: Flange adapters (option /TFD, /TFN) for –TG sensor in combination with T-piece

T-piece:

Partno.	Flanges	Description
K1500HG	DN80 PN10	T-piece, DN80 flange
K1500HF	DN100 PN10	T-piece, DN100 flange



		A	B	C
DN65	PN10	185	145	4x ø18
DN80	PN10	200	160	8x ø18
DN100	PN10	220	180	8x ø18

Fig 9: T-piece dimensions

3.1.3 Installation of ISC40G(S)-GS with flange adapters

The ISC40G(S)-GS sensor is designed for sanitary applications. For these applications special process connections are necessary.

Mounting procedure:

- Screw the tube completely in the stainless steel nut.
- Thread the sensor cable through the flange adapter parts in the right sequence.
- Screw the tube hand tight into the flange, a mechanical stop will be felt.
- Tighten the plastic nut onto the sensor; screw the plastic nut completely tight.
- Tighten the stainless steel nut for locking the sensor.

Sensor is installed correctly if the flats on the sensor are aligned perpendicular on the process flow.

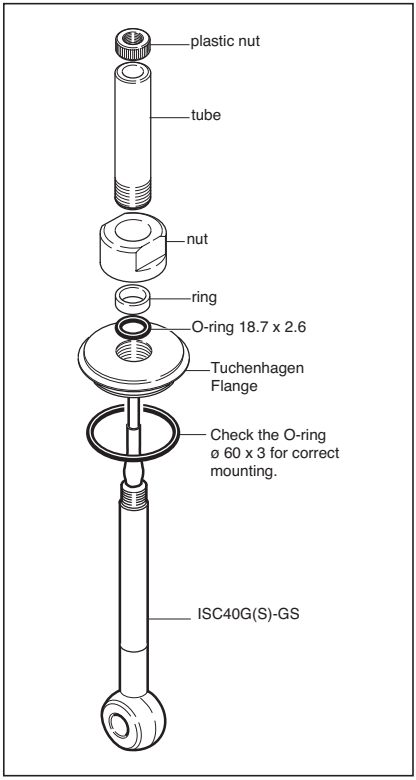


Fig 10: Installation /SFT

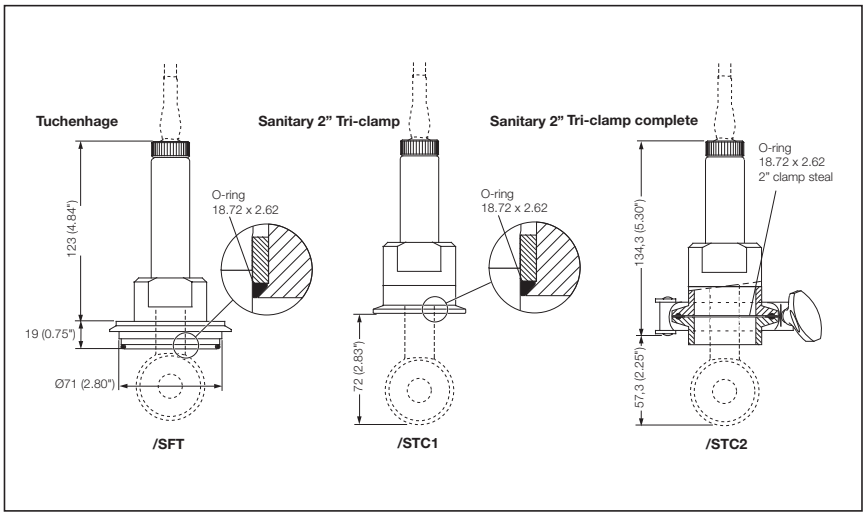


Fig 11: Option /SFT, /STC1, /STC2

4 DIMENSIONS ISC40 SENSOR

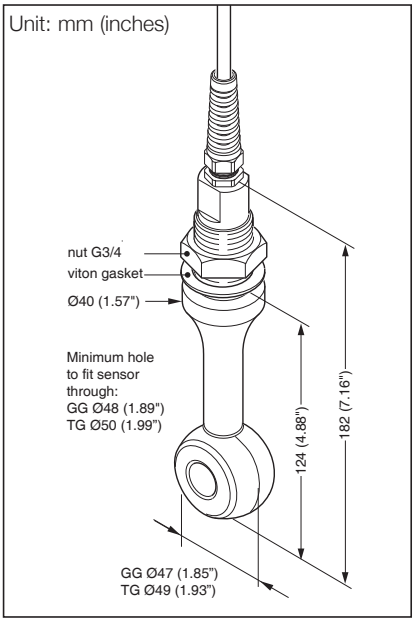


Fig 12: ISC40G(S)-GG (TG)

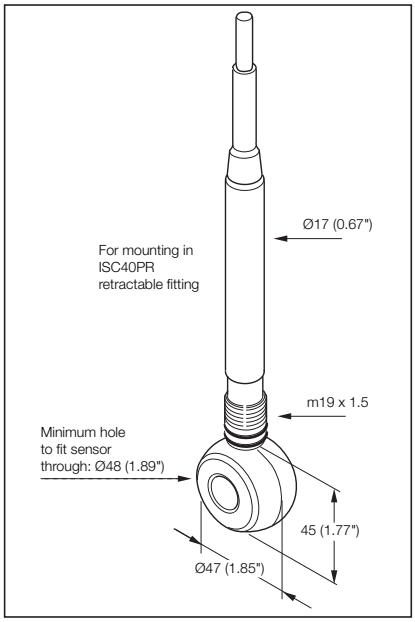


Fig 13: ISC40G(S)-GR

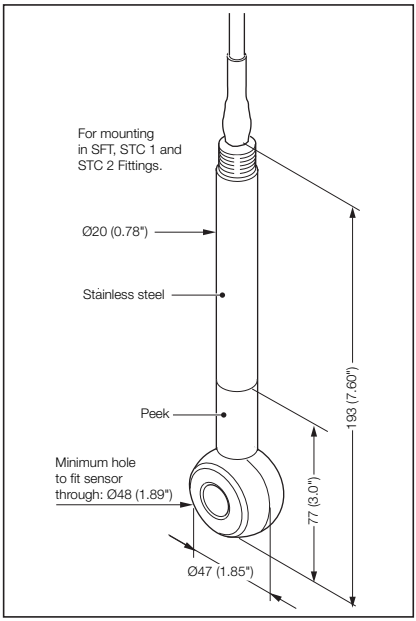


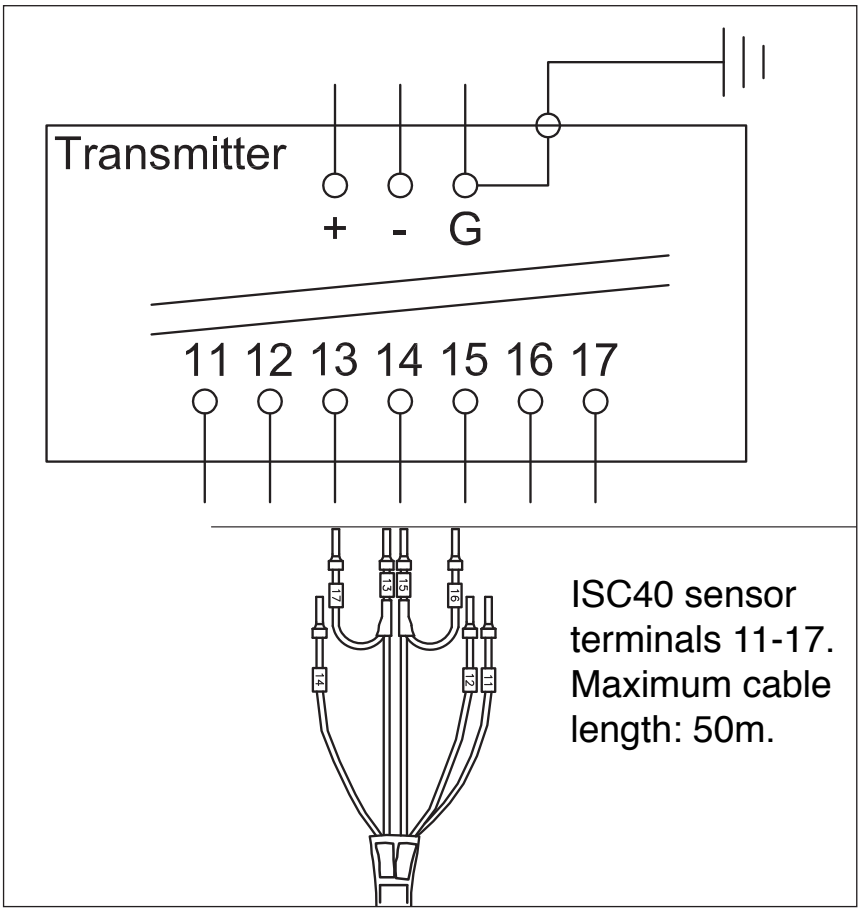
Fig 14: ISC40G(S)-GS

5 WIRING ISC40 SENSOR

The ISC40 sensor is provided with a fixed cable. The connections of this dual coax cable and the Yokogawa Inductive Conductivity analyser are given in table 1.

Table 1: Definition cable and analyzer

Cable wire color	ISC analyser terminal #	Signal description
Red	11	Temperature
Blue	12	Temperature
Yellow	14	Shield
White	15	Primary coil
White (shield)	16	Primary coil
Brown	13	Secondary coil
Brown (shield)	17	Secondary coil



6 MODELCODE ISC40 SENSOR

Model Code	Suffix Code	Option	Description
ISC40G			General purpose inductive conductivity sensor
Type	- GG		Glass filled PEEK, general model
	- GR		Glass filled PEEK, retractable model
	- GS		Glass filled PEEK, shaft model
	- TG		PFA, general model
Temperature sensor	- T1		Pt1000 (not possible in combination with IC200)
	- T3		30k thermistor
Cable length	- 03		03 meter
	- 05		05 meter
	- 10		10 meter
	- 15		15 meter
	- 20		20 meter
Flange adapters - GG, - TG		/SFA	AISI 316 SS, 2” ANSI 150 lbs
		/SFD	AISI 316 SS, DN50 PN16
		/STW	AISI 316 SS, 3” tri-clamp
		/S2W	AISI 316 SS, 2” tri-clamp
		/TFD	TFM, DN65 PN10
		/TFN	TFM without DN65 PN10 flange
Flange adapters - GS		/SFT	AISI 316 SS, Sanitary Tuchenhagen
		/STC1	AISI 316 SS, Sanitary 2” tri-clamp
		/STC2	AISI 316 SS, Tri-clamp complete
Certificates		/M	Material certificate (for - GG and - GR only)
		/Q	Quality certificate

Model Code	Suffix Code	Option	Description
ISC40S			Intrinsically safe inductive conductivity sensor
Type	- GG		Glass filled PEEK, general model
	- GR		Glass filled PEEK, retractable model
	- GS		Glass filled PEEK, shaft model
	- TG		PFA, general model
Temperature sensor	- T1		Pt1000 (not possible in combination with IC200)
	- T3		30k thermistor
Cable length	- 03		03 meter
	- 05		05 meter
	- 10		10 meter
	- 15		15 meter
	- 20		20 meter
Flange adapters - GG, - TG		/SFA	AISI 316 SS, 2” ANSI 150 lbs
		/SFD	AISI 316 SS, DN50 PN16
		/STW	AISI 316 SS, 3” tri-clamp
		/S2W	AISI 316 SS, 2” tri-clamp
		/TFD	TFM, DN65 PN10
		/TFN	TFM without DN65 PN10 flange
Flange adapters - GS		/SFT	AISI 316 SS, Sanitary Tuchenhagen
		/STC1	AISI 316 SS, Sanitary 2” tri-clamp
		/STC2	AISI 316 SS, Tri-clamp complete
Certificates		/M	Material certificate (for - GG and - GR only)
		/Q	Quality certificate

7 SPAREPARTS ISC40 SENSOR

Parts ISC40 sensor				
Part no.	Description		Material	Quantity
K1500AM	Gasket		Viton	5
K1500AL	Mounting nut		AISI 316 SS	3
Options ISC40 sensor, Flange adapters				
Part no.	Description	Process connection	Material	O-ring(s)
K1541ZR	/SFA	2” ANSI 150 lbs	AISI 316 SS	Viton
K1541ZQ	/SFD	NW50-PN16	AISI 316 SS	Viton
K1541KB	/STW	3” tri-clamp	AISI 316 SS	EPDM
K1541KC	/S2W	2” tri-clamp	AISI 316 SS	EPDM
K1541XF	/TFD	DN65 PN10	AISI 316 SS,TFM	Kalrez
K1541XG	/TFN	used with DN65 PN10	TFM	Kalrez
K1541ZP	/SFT	Sanitary Tuchenhagen	AISI 316 SS	EPDM
K1541ZG	/STC1	Sanitary 2” tri-clamp	AISI 316 SS	EPDM
K1541ZF	/STC2	Tri-clamp complete	AISI 316 SS	EPDM

Note: Other O-ring materials are available as sparepart

O-rings ISC40 sensor, Flange adapters				
Part no.	Description	Dimensions	Material	Quantity
O-rings /SFA, /SFD				
K1500CA	O-ring set	40.64 x 5.33; 26.57 x 3.53	EPDM	5 sets
K1500CB	O-ring set	40.64 x 5.33; 26.57 x 3.53	Viton	5 sets
K1500CC	O-ring set	40.64 x 5.33; 26.57 x 3.53	Silicon	5 sets
K1500CD	O-ring	40.64 x 5.33	Kalrez	1
K1500CH	O-ring	26.57 x 3.53	Kalrez	1
O-rings /STW				
K1541ZK	O-ring set	40.87 x 3.53; 26.65 x 2.62; 3” seal-clamp	EPDM	2 sets
K1500DL	O-ring set	40.87 x 3.53; 26.65 x 2.62; 3” seal-clamp	Viton	2 sets
K1500DM	O-ring set	40.87 x 3.53; 26.65 x 2.62; 3” seal-clamp	Silicon	2 sets
O-rings /S2W				
K1541ZH	O-ring set	40.87 x 3.53; 26.65 x 2.62; 2” seal-clamp	EPDM	2 sets
K1500DJ	O-ring set	40.87 x 3.53; 26.65 x 2.62; 2” seal-clamp	Viton	2 sets
K1500DK	O-ring set	40.87 x 3.53; 26.65 x 2.62; 2” seal-clamp	Silicon	2 sets
O-rings /TFD, /TFN				
K1500AH	O-ring	29.74 x 3.53	Kalrez	1
O-rings /SFT				
K1500CM	O-ring set	18.72 x 2.62; 60 x 3	EPDM	5 sets
K1500CL	O-ring set	18.72 x 2.62; 60 x 3	Viton	5 sets
K1500CN	O-ring set	18.72 x 2.62; 60 x 3	Silicon	5 sets
O-rings /STC1				
K1500CQ	O-ring	18.72 x 2.62	EPDM	5
K1500CP	O-ring	18.72 x 2.62	Viton	5
K1500CR	O-ring	18.72 x 2.62	Silicon	5
O-rings /STC2				
K1500CT	O-ring set	18.72 x 2.72; 2” seal-clamp	EPDM	5 sets
K1500CS	O-ring set	18.72 x 2.72; 2” seal-clamp	Viton	5 sets
K1500CU	O-ring set	18.72 x 2.72; 2” seal-clamp	Silicon	5 sets

8 EU DECLARATION OF CONFORMITY

We: Yokogawa Europe B.V.
Euroweg 2, 3825 HD Amersfoort
The Netherlands

herewith declare under our sole responsibility that the products, model: **ISC40G** and **ISC40S** further specified with model suffix- and option codes: **As listed in Annex-1 in this document** are manufactured in accordance with the requirements for CE-marking of products as stated in EC Decision:

768/2008/EC on a common framework for the marketing of products

by applying the following standards:

EN-ISO 9001: 2008 **Quality management systems - Requirements**

Products ISC40G and ISC40S are:

- In compliance with the essential requirements of the specific product legislation:

- Pressure Equipment **Directive 97/23/EC (PED)**
As amended by Regulation (EC) no. 1882/2003, by applying:
Article 3.3: Sound Engineering Practice

- Produced according to appropriate quality control procedures.

Product ISC40S is:

- In compliance with the essential requirements of the specific product legislation:

- Potentially explosive atmospheres (ATEX) **Directive 94/9/EC**
As amended by Regulation (EC) no. 1882/2003
by applying the following standards:

EN 60079-0: 2009	Explosive atmospheres – Part 0: Equipment – General requirements
EN 60079-11: 2007	Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”
EN 60079-26: 2007	Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga

The provisions fulfilled are: II 1 G Ex ia IIC T4...T6 Ga

Number of the EC-type Examination Certificate: **DEKRA 11 ATEX 0063 X**
Name of the notified body: DEKRA Certification B.V.
Identification number of the notified body: 0344
Address of the notified body: Utrechtseweg 310, 6812 AR Arnhem, The Netherlands

The CE-mark has been affixed on the product in 2000 for the first time.

Amersfoort, 1 October 2012

H. Leijten
General Manager
Yokogawa Process Analyzers (YPA)
Yokogawa Europe B.V.

Annex-1

Model Code	Suffix Code	Option	Description
ISC40G			General purpose inductive conductivity sensor
Type	- GG		Glass filled PEEK, general model
	- GR		Glass filled PEEK, retractable model
	- GS		Glass filled PEEK, shaft model
	- TG		PFA, general model
Temperature sensor	- T1		Pt1000 (not possible in combination with IC200)
	- T3		30k thermistor
Cable length	- 03		03 meter
	- 05		05 meter
	- 10		10 meter
	- 15		15 meter
	- 20		20 meter
Flange adapters - GG, - TG		/SFA	AISI 316 SS, 2” ANSI 150 lbs
		/SFD	AISI 316 SS, DN50 PN16
		/STW	AISI 316 SS, 3” tri-clamp
		/S2W	AISI 316 SS, 2” tri-clamp
		/TFD	TFM, DN65 PN10
		/TFN	TFM without DN65 PN10 flange
Flange adapters - GS		/SFT	AISI 316 SS, Sanitary Tuchenhagen
		/STC1	AISI 316 SS, Sanitary 2” tri-clamp
		/STC2	AISI 316 SS, Tri-clamp complete
Certificates		/M	Material certificate (for - GG and - GR only)
		/Q	Quality certificate

Model Code	Suffix Code	Option	Description
ISC40S			Intrinsically safe inductive conductivity sensor
Type	- GG		Glass filled PEEK, general model
	- GR		Glass filled PEEK, retractable model
	- GS		Glass filled PEEK, shaft model
	- TG		PFA, general model
Temperature sensor	- T1		Pt1000 (not possible in combination with IC200)
	- T3		30k thermistor
Cable length	- 03		03 meter
	- 05		05 meter
	- 10		10 meter
	- 15		15 meter
	- 20		20 meter
Flange adapters - GG, - TG		/SFA	AISI 316 SS, 2” ANSI 150 lbs
		/SFD	AISI 316 SS, DN50 PN16
		/STW	AISI 316 SS, 3” tri-clamp
		/S2W	AISI 316 SS, 2” tri-clamp
		/TFD	TFM, DN65 PN10
		/TFN	TFM without DN65 PN10 flange
Flange adapters - GS		/SFT	AISI 316 SS, Sanitary Tuchenhagen
		/STC1	AISI 316 SS, Sanitary 2” tri-clamp
		/STC2	AISI 316 SS, Tri-clamp complete
Certificates		/M	Material certificate (for - GG and - GR only)
		/Q	Quality certificate

Further specifications can be found in General Specification Sheet GS 12D8J2-E-E

9 ISC40FS – FLOW FITTING SUBASSEMBLY

9.1 General Specifications

9.1.1 Materials

Wetted parts

Model ISC40FS-FCSA	: PVDF (Kynar); Viton
Model ISC40FS-PCSA	: Polypropylene; Viton
Model ISC40FS-SCSA	: AISI 316 SS; Viton
Model ISC40FS-SCWN	: AISI 316 SS; Viton

Non-wetted parts

Nut : AISI 304 SS

9.1.2 Operating range

Temperature

Model ISC40FS-FCSA	: Max. 130°C (266°F)
Model ISC40FS-PCSA	: Max. 100°C (212°F)
Model ISC40FS-SCSA	: Max. 150°C (302°F)
Model ISC40FS-SCWN	: Max. 150°C (302°F)

Pressure

Model ISC40FS-FCSA	: Max. 10 bar (150 PSI) at 20°C (68°F) Max. 1 bar (15 PSI) at 130°C (266°F)
Model ISC40FS-PCSA	: Max. 6 bar (90 PSI) at 20°C (68°F) Max. 1 bar (15 PSI) at 100°C (212°F)
Model ISC40FS-SCSA	: Max. 10 bar (150 PSI) at operating temperature
Model ISC40FS-SCWN	: Max. 10 bar (150 PSI) at operating temperature

9.1.3 Shipping details

Package size (LxWxH)	: 215 x 150 x 55 mm (8.46 x 5.90 x 2.17 inch)
Package weight (max.)	: 0.9 kg (2.0 lbs)

9.1.4 Process connections

2” screw-in coupling or weld-in coupling

Note: The ISC40 sensor type GG and TG are supplied with a Viton gasket. This gasket may be used with the older series of ISC40FS fittings. It should be discarded when the sensor is mounted in combination with the ISC40FS type FCSA and PCSA.

9.2 Installation of ISC40 sensor in ISC40FS

The key difference between a sensor adapter and a subassembly is, that with subassembly installation the sensor can be removed from the process installation without removing the subassembly first. This allows easier access to the sensor for maintenance activities. Generally, the subassembly consists of three parts of which one part is fitted permanently to the process installation (welded or threaded); the second part is fitted to the sensor and the third part holds the earlier parts together. In addition to these parts there are elastomeric seals were appropriate. Standard O-ring material is Viton, other O-ring materials are available as sparepart (see Figs 15 and 16).

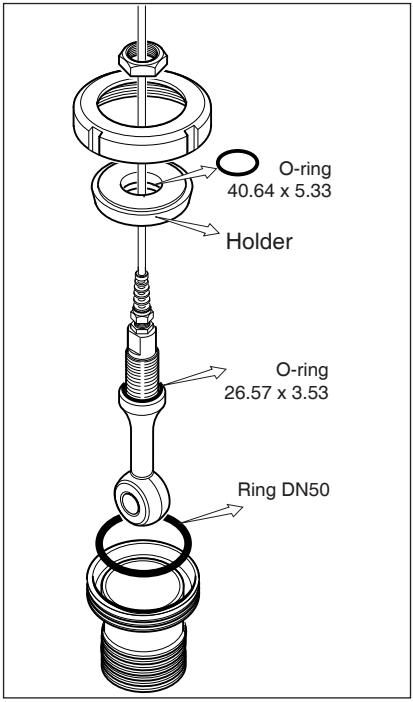


Fig 15: ISC40 sensor in screw-in subassembly ISC40FS-SCSA

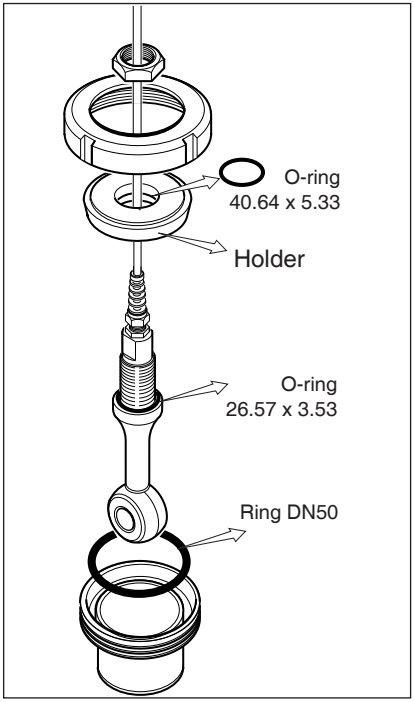


Fig 16: ISC40 sensor in weld-in subassembly ISC40FS-SCWN

9.3 Dimensions ISC40FS

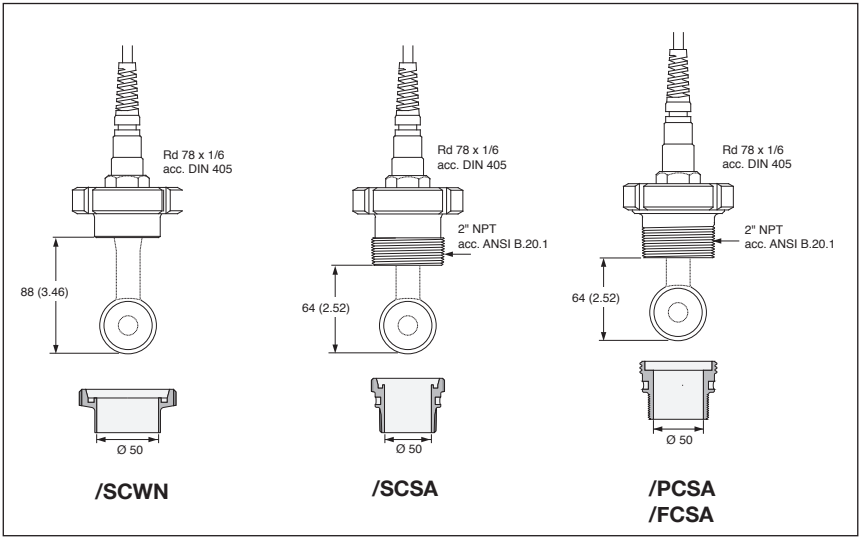


Fig 17: Dimensions ISC40FS with sensor installed (dimensions in mm (inches))

9.4 Modelcode ISC40FS

Model	Suffix	Option	Description
ISC40FS			Flow fitting subassembly
Material	-F		PVDF
	-P		Polypropylene
	-S		Stainless Steel
Process connection	-CS		Dairy Coupling screw-in*
	-CW		Dairy Coupling welded*
Thread type NPT or R	-A		NPT
	-N		No thread (for weld-in couplings)
Options		/M	Material certificate 3.1. EN 10024 (for wetted metal parts only)

*** Note:** according to Din 11851

9.5 Spareparts ISC40FS

Parts ISC40FS subassembly				
Part no.	Description	Dimensions	Material	O-ring
K1541KD	Holder + O-rings	2”	PVDF	Viton
K1541KL	Holder + O-rings	2”	Polypropylene	Viton
K1541KA	Holder + O-rings	2”	AISI 316 SS	Viton

Note: Other O-ring materials are available as sparepart

O-rings ISC40FS subassembly				
Part no.	Description	Dimensions	Material	Quantity
O-rings -FCSA, -PCSA, -FCWN, -PCWN				
K1500DF	O-ring set	40.64 x 5.33; 26.57 x 3.53; 56.52 x 5.33	EPDM	5 sets
K1500DE	O-ring set	40.64 x 5.33; 26.57 x 3.53; 56.52 x 5.33	Viton	5 sets
K1500DG	O-ring set	40.64 x 5.33; 26.57 x 3.53; 56.52 x 5.33	Silicon	5 sets
K1500CD	O-ring	40.64 x 5.33	Kalrez	1
K1500CH	O-ring	26.57 x 3.53	Kalrez	1
K1500DH	O-ring	56.52 x 5.33	Kalrez	1
O-rings –SCSA, -SCWN				
K1500DB	O-ring set	40.64 x 5.33; 26.57 x 3.53; Ring DN50	EPDM	5 sets
K1500DA	O-ring set	40.64 x 5.33; 26.57 x 3.53; Ring DN50	Viton	5 sets
K1500DC	O-ring set	40.64 x 5.33; 26.57 x 3.53; Ring DN50	Silicon	5 sets
K1500CD	O-ring	40.64 x 5.33	Kalrez	1
K1500CH	O-ring	26.57 x 3.53	Kalrez	1
K1500DD	O-ring	53.34 x 5.33	Kalrez	1

Note: O-ring 53.34 x 5.33 (K1500DD) is used as a Kalrez replacement for the Ring DN50.

10 ISC40FF – FLOW FITTING

10.1 General Specifications

10.1.1 Materials

Wetted parts

Model ISC40FF-S	: AISI 316 SS; Viton
Model ISC40FF-P	: Polypropylene; Viton
Model ISC40FF-F	: PVDF (Kynar); Viton
Non-wetted parts	: AISI 304 SS or AISI 316 SS

10.1.2 Operating range

Temperature

Model ISC40FF-S	: Max. 150°C (302°F)
Model ISC40FF-P	: Max. 100°C (212°F)
Model ISC40FF-F	: Max. 130°C (266°F)

Pressure

Model ISC40FF-S	: Max. 10 bar (150 PSI) at operating temperature
Model ISC40FF-P	: Max. 6 bar (90 PSI) at 20°C (68°F) Max. 1 bar (15 PSI) at 100°C (212°F)
Model ISC40FF-F	: Max. 10 bar (150 PSI) at 20°C (68°F) Max. 1 bar (15 PSI) at 130°C (266°F)

10.1.3 Shipping details

Package size (LxWxH)	: 250 x 150 x 100 mm (9.84 x 5.90 x 3.94 inch)
Package weight (max)	: 1.5 kg (3.3 lbs)

10.1.4 Process connections

1/2" NPT in flow fitting, connected with optional flange adapters to the actual installation.

Note: The ISC40 sensor type -GG and -TG are supplied with a Viton gasket. This gasket may be used with the older series of ISC40FF fittings. It should be discarded when the sensor is mounted in combination with the ISC40FF type -PA and -FA.

10.2 Installation of ISC40 sensor in ISC40FF

Installation of the flow fittings involves two steps (see Fig 18):

- Installation of the sensor
  The sensor has to be mounted in the flow fitting. It is important that the position of the sensor in the fitting allows easy flow through the hole of the sensor donut. Generally good flow is assured if the flats of the sensor are oriented perpendicular to the outlet piping. It is also important that the sample piping is oriented in such a way that the direction of the flow is upwards to assure complete filling of the flow chamber
- Installation of the fitting on wall, railing or stanchion
  For this purpose the flow fitting has an optional pipe/wall mounting kit /MS or /MP (see Fig 19 for details). This kit consists of a clamp ring with bolts and nuts which clamps around the flow chamber. Therefore the flow chamber can be turned in the mounting assembly allowing more flexibility in installation. The mounting plate can be mounted on a wall or panel with 2-4 anchor bolts with a diameter of 10 mm (3/8") max. For those installations where pipe mounting is requested (2" nominal pipe), either horizontal or vertical, a saddle and U-bolt have to be used.

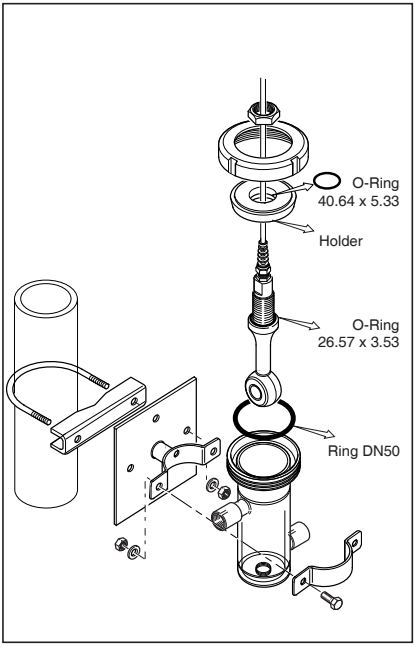


Fig 18: Installation of ISC40 sensor in flow fitting

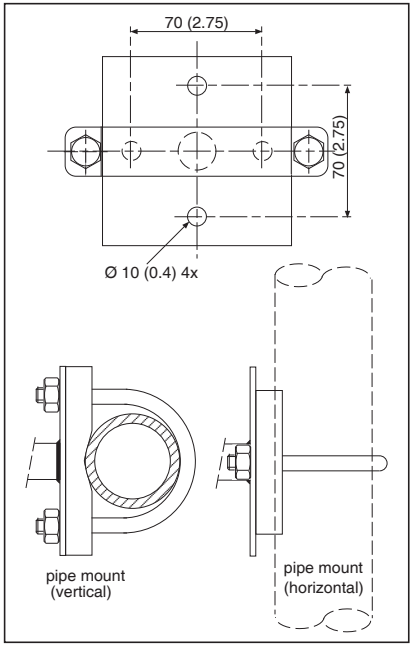
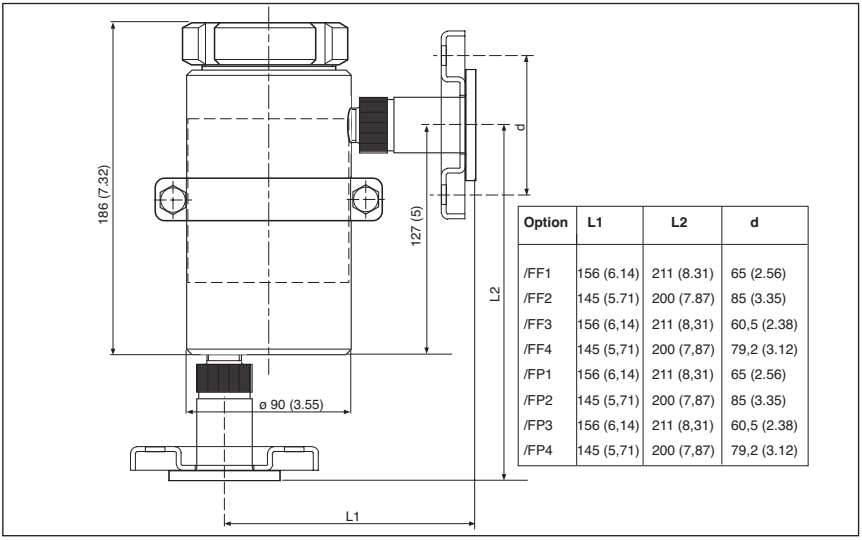


Fig 19: Pipe/wall mounting kit

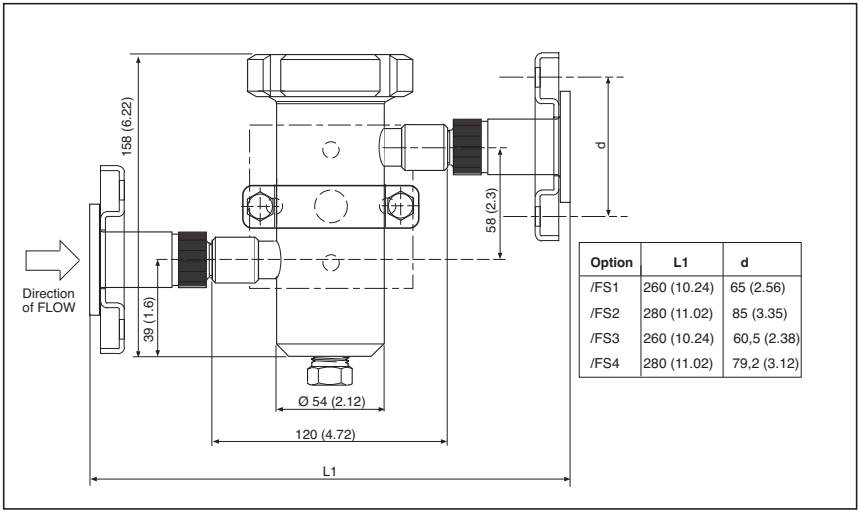
Note: The ISC40 sensor type -TG does not fit in the model ISC40FF-S.

10.3 Dimensions ISC40FF



Option	L1	L2	d
/FF1	156 (6.14)	211 (8.31)	65 (2.56)
/FF2	145 (5.71)	200 (7.87)	85 (3.35)
/FF3	156 (6,14)	211 (8,31)	60,5 (2.38)
/FF4	145 (5,71)	200 (7,87)	79,2 (3.12)
/FP1	156 (6,14)	211 (8,31)	65 (2.56)
/FP2	145 (5,71)	200 (7,87)	85 (3.35)
/FP3	156 (6,14)	211 (8,31)	60,5 (2.38)
/FP4	145 (5,71)	200 (7,87)	79,2 (3.12)

Fig 20: Flow fitting ISC40FF-P, ISC40FF-F



Option	L1	d
/FS1	260 (10.24)	65 (2.56)
/FS2	280 (11.02)	85 (3.35)
/FS3	260 (10.24)	60,5 (2.38)
/FS4	280 (11.02)	79,2 (3.12)

Fig 21: Flow fitting ISC40FF-S

10.4 Modelcode ISC40FF

Model	Suffix	Option	Description
ISC40FF			flow fitting
Material	-S		AISI 316 stainless steel
	-P		Polypropylene (PP)
	-F		PVDF (KYNAR®)
Process connection	-A		NPT
1/2”NPT Flange adapters		/FF1	PVDF, DN15 PN10
		/FF2	PVDF, DN25 PN10
		/FF3	PVDF, ANSI 1/2”-150lbs
		/FF4	PVDF, ANSI 1”-150lbs
		/FP1	PP, DN15 PN10
		/FP2	PP, DN25 PN10
		/FP3	PP, ANSI 1/2”-150lbs
		/FP4	PP, ANSI 1”-150lbs
		/FS1	AISI 316 SS, DN15 PN10
		/FS2	AISI 316 SS, DN25 PN10
		/FS3	AISI 316 SS, ANSI 1/2”- 150lbs
		/FS4	AISI 316 SS, ANSI 1”- 150lbs
Mounting set		/MS	Wall/pipe for SS flow fitting
		/MP	Wall/pipe for PP or PVDF flow fitting
Material certificate		/M	3.1. according EN 10024 (for wetted metal parts only)

10.5 Spareparts ISC40FF

Options ISC40FF Flow fitting, flange adapters				
Part no.	Description	Process connection	Material	O-ring(s)
K1521AL	/FF1	DN15 PN10	PVDF	Viton
K1521AP	/FF2	DN25 PN10	PVDF	Viton
K1521AE	/FF3	ANSI ½" – 150 lbs	PVDF	Viton
K1521AH	/FF4	ANSI 1" – 150 lbs	PVDF	Viton
K1521AM	/FP1	DN15 PN10	PP	Viton
K1521AQ	/FP2	DN25 PN10	PP	Viton
K1521AF	/FP3	ANSI ½" – 150 lbs	PP	Viton
K1521AJ	/FP4	ANSI 1" – 150 lbs	PP	Viton
K1521AK	/FS1	DN15 PN10	AISI 316 SS	Viton
K1521AN	/FS2	DN25 PN10	AISI 316 SS	Viton
K1521AD	/FS3	ANSI ½" – 150 lbs	AISI 316 SS	Viton
K1521AG	/FS4	ANSI 1" – 150 lbs	AISI 316 SS	Viton

Note: Other O-ring materials are available as sparepart

Parts ISC40FF Flow fitting				
Part no.	Description	Dimensions	Material	O-ring
K1541KD	Holder + O-rings	2"	PVDF	Viton
K1541KL	Holder + O-rings	2"	Polypropylene	Viton
K1541KA	Holder + O-rings	2"	AISI 316 SS	Viton

Note: Other O-ring materials are available as sparepart

O-rings ISC40FF Flow fitting				
Part no.	Description	Dimensions	Material	Quantity
		O-rings -SA		
K1500DB	O-ring set	40.64 x 5.33; 26.57 x 3.53; Ring DN50	EPDM	5 sets
K1500DA	O-ring set	40.64 x 5.33; 26.57 x 3.53; Ring DN50	Viton	5 sets
K1500DC	O-ring set	40.64 x 5.33; 26.57 x 3.53; Ring DN50	Silicon	5 sets
K1500CD	O-ring	40.64 x 5.33	Kalrez	1
K1500CH	O-ring	26.57 x 3.53	Kalrez	1
K1500DD	O-ring	53.34 x 5.33	Kalrez	1
O-rings -PA, -FA				
K1500DF	O-ring set	40.64 x 5.33; 26.57 x 3.53; 56.52 x 5.33	EPDM	5 sets
K1500DE	O-ring set	40.64 x 5.33; 26.57 x 3.53; 56.52 x 5.33	Viton	5 sets
K1500DG	O-ring set	40.64 x 5.33; 26.57 x 3.53; 56.52 x 5.33	Silicon	5 sets
K1500CD	O-ring	40.64 x 5.33	Kalrez	1
K1500CH	O-ring	26.57 x 3.53	Kalrez	1
K1500DH	O-ring	56.52 x 5.33	Kalrez	1

Note: O-ring 53.34 x 5.33 (K1500DD) is used as a Kalrez replacement for the Ring DN50.

11 ISC40FD – IMMERSION FITTING

11.1 General Specifications

11.1.1 Materials

Wetted parts without options

Model ISC40FD-S	: AISI 316 SS, Viton
Model ISC40FD-V	: C-PVC, Viton
Flange ISC40FD-S-**-SF*	: AISI 316 SS

Non-wetted parts

Tube pigtail	: plastic

11.1.2 Operating range

Temperature

Model ISC40FD-S	: Max. 150°C (302°F)
Model ISC40FD-V	: Max. 80°C (176°F)

Pressure

Model ISC40FD-S	: Max. 10 bar (150 PSI) at operating temperature
Model ISC40FD-V	: Max. 2 bar (30 PSI) at 20°C (68°F) Max. 1 bar (15 PSI) at 80°C (176°F)

11.1.3 Process connections

Flange AISI 316 SS 2" or AISI 316 SS DN50, for the type –V an adjustable optional flange is available with ANSI 2" 150 lbs and DN50 PN10 hole pattern.

Note: The ISC40 sensor type -GG and -TG are supplied with a Viton gasket. This gasket may be used with the older series of ISC40FD fittings. It should be discarded when the sensor is mounted in combination with the ISC40FD type -S and -V.

11.2 Installation of ISC40 sensor in ISC40FD

Installation of the immersion fittings involves two steps:

- Installation of the sensor
  The sensor has to be mounted in the immersion fitting (see Fig 22).
- Installation in the application
  - o On a railing or stanchion
    For this purpose the immersion fitting has an optional rail mounting kit /MS1. This kit consists of a piece of guide pipe and two pipe clamps. The guide pipe is mounted horizontally to the stanchion using one pipe clamp. The second pipe clamp connects the guide pipe to the immersion fitting. The distance between the pipe clamps determines the distance between the stanchion and immersion fitting (see Fig 23).
  - o With flange
    For this purpose a stainless steel immersion fitting can be ordered as type - SFD (DN50) or type –SFA (2"). The PVC immersion fitting has an optional depth adjustable mounting flange /FA (with DN50 PN10 and ANSI 2" 150 lbs hole pattern) which is illustrated in Fig 24. You must assure that the mating flange has the same hole pattern as the supplied flange.

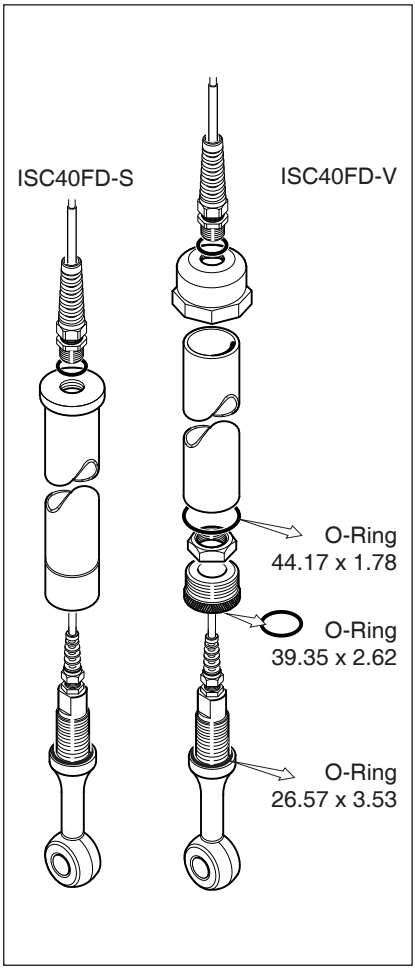


Fig 22: Installation of ISC40 sensor in immersion fitting.

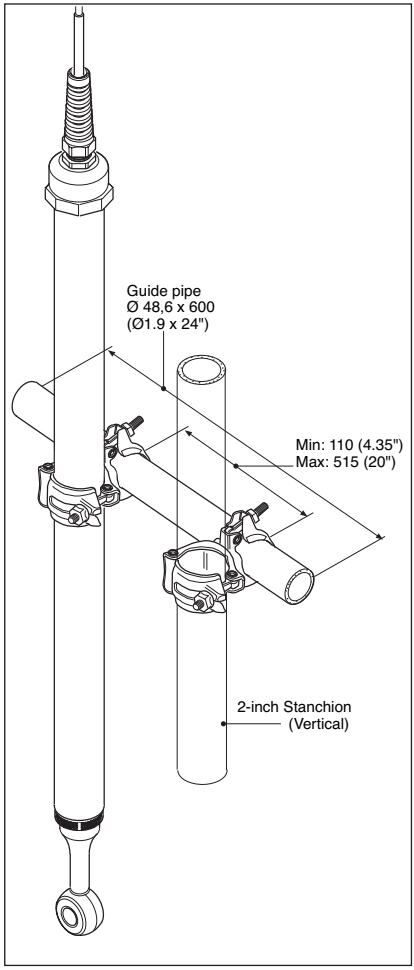


Fig 23: Installation on stanchion with /MS1

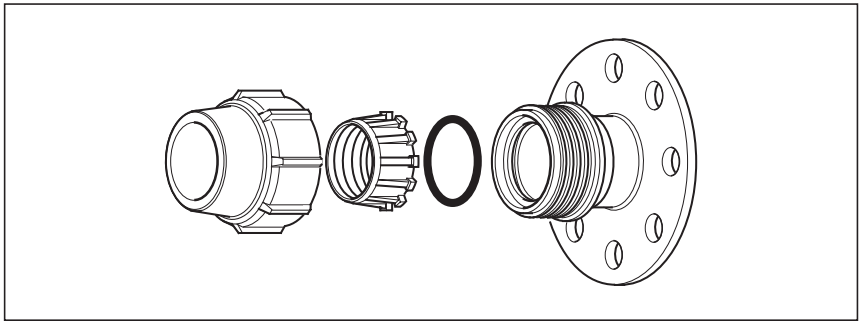


Fig 24: Option /FA

Alternative ways of mounting the immersion fitting are:

- Guide pipe
  To facilitate this type of mounting the immersion fitting has a larger diameter at the top. The user supplied guide pipe (internal diameter > 52 mm) is fitted to the wall or mounting rail. The immersion fitting slides into this guide pipe and therefore the sensor can be easily removed for inspection.
- Platform mounting
  Sometimes there is a walking platform that can be used to mount the immersion fitting. The top of the immersion fitting has a larger diameter than the shaft. The only thing to do is to drill a precise hole in the platform to slide the fitting through.

11.3 Dimensions ISC40FD

Dimensions in mm (inches)

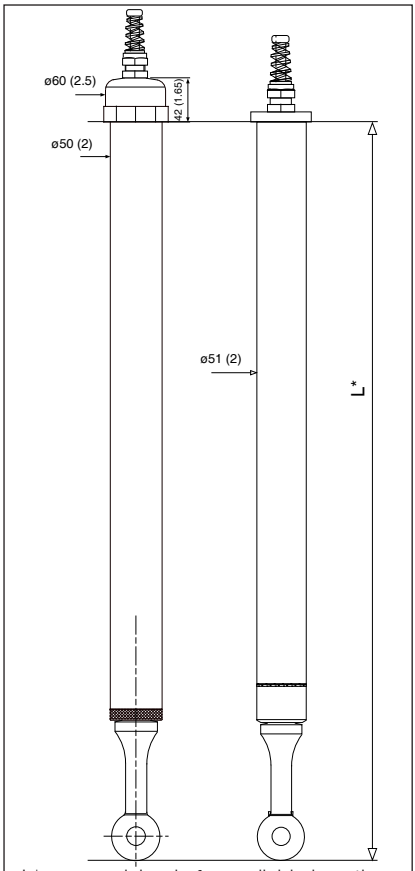


Fig 25: Immersion fitting ISC40FD

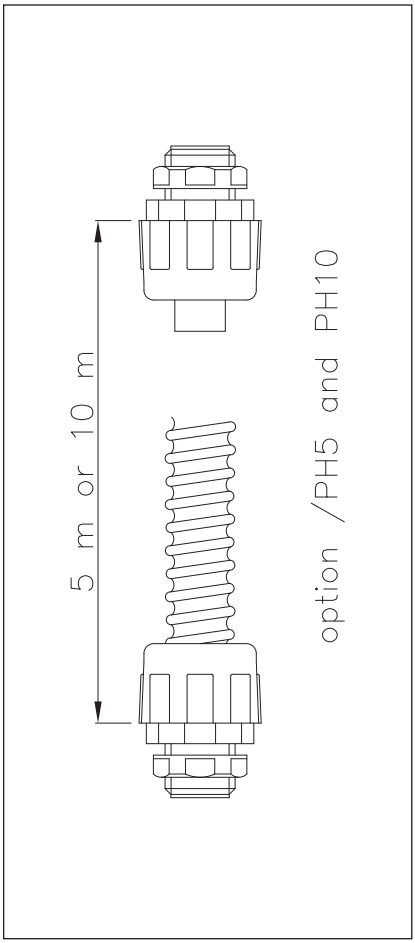


Fig 26: Protection hose, option /PH5, /PH10

11.4 Modelcode ISC40FD

Model code	Suffix code	Option code	Description
ISC40FD			Immersion fitting
Material	-S		AISI 316 Stainless steel
	-V		PVC-C
Insertion length	- □ □		Between 05 to 20 Example: 05 = 0.5 m / 20 = 2.0 m
Flange	-NFL		No flange
	-SFA		AISI316 SS 2”
	-SFD		AISI316 SS DN50
Options		/MS1	Pipe mounting set (Carbon steel)
		/FA	Adjustable flange with DIN DN50-PN10 and ANSI 2” 150 lbs hole pattern (only for PVC)
		/PH5	Protection hose for 5 m cable
		/PH10	Protection hose for 10 m cable
Material certificate		/M	3.1. according EN 10204 (for wetted metal parts only)

Note: option /FA only for ISC40FD-V; option /M only for ISC4FD-S

11.5 Spareparts ISC40FD

Options ISC40FD Flow fitting				
Part no.	Description	Process connection	Material	
K1541ZY	/MS1		Carbon steel	
K1520EV	/FA	DN50 PN10; ANSI 2” lbs	PP	
K1500CJ	/PH5		PVC, PA6.6	
K1500CK	/PH10		PVC, PA 6.6	
O-rings ISC40FD Immersion fitting				
Part no.	Description	Dimensions	Material	Quantity
O-rings -S				
K1500CE	O-ring set	39.35 x 2.62; 26.57 x 3.53	EPDM	5 sets
K1500CF	O-ring set	39.35 x 2.62; 26.57 x 3.53	Viton	5 sets
K1500CG	O-ring set	39.35 x 2.62; 26.57 x 3.53	Silicon	5 sets
K1500CV	O-ring	39.35 x 2.62	Kalrez	1
K1500CH	O-ring	26.57 x 3.53	Kalrez	1
O-rings -V				
K1500CX	O-ring set	39.35 x 2.62; 26.57 x 3.53; 44.17 x 1.78	EPDM	5 sets
K1500CW	O-ring set	39.35 x 2.62; 26.57 x 3.53; 44.17 x 1.78	Viton	5 sets
K1500CY	O-ring set	39.35 x 2.62; 26.57 x 3.53; 44.17 x 1.78	Silicon	5 sets

12 Chemical Compatibility Chart

			Material						
			PVDF (Kynar)	S.S. 316	VITON	PEEK	PP	PVC	PFA
		Temp. °C / % Conc.	20 60 100	20 60 100	20 60 100	20 60 100	20 60	20 60	20 60 100
Inorganic acid	Sulfiric acid	10	O O O	X X X	O O O	O O O	O O	O X	O O O
		50	O O O	X X X	O O O	O O X	O O	O O	O O O
		95	O X -	X X X	O O O	- - -	X -	X X	O O O
		fuming	- - -	- - -	O O O	- - -	- -	- -	O O O
	Hydrochloric acid	10	O O O	- - -	O O O	O O X	O O	OX	O O O
		sat.	O O O	- - -		O O X	O O	O O	O O O
	Nitric acid	25	O O X	X X X	O O X	O O O	O O	O X	O O O
		50	O O X	X X X	- - -	X X X	X -	O X	O O O
		95	O X -	O O O	- - -	- - -	- -	- -	O O O
		fuming	- - -	O O O	- - -	- - -	- -	- -	O O O
	Phosphoric acid	25	O O O	- - -	O O O	O O O	O O	O X	O O O
		50	O O O	X X X	O O O	O O O	O O	O O	O O O
		95	O O O	O O O	X X -	O O O	O O	O O	O O O
	Hydrofluoric acid	40	O O O	- - -	O O O	- - -	O O	OX	O O O
		75	O O O	- - -	O O O	- - -	O O	XX	O O O
Organic acid	Acetic acid	10	O O O	O O X	- - -	O O O	O O	O X	O O O
		glacial	O X -	O O X	- - -	O O X	O X	X X	O O O
	Formic acid	80	O O O	X X X	- - -	X X X	O O	O -	O O X
	Citric acid	50	O O O	O O O	O O O	O O O	O O	O O	O O O
Alkali	Calcium hydroxide	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
	Potassium hydroxide	50	O O X	O O O	O O O	O O O	O O	O O	O O O
	Sodium hydroxide	40	O O X	O O O	X X X	O O O	O O	O X	O O O
	Ammonia in water	30	O O O	O O O	X X X	O O O	O O	O X	O O O
Acid salt	Ammonium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Zinc chloride	50	O O O	X X X	O O O	O O O	O O	O O	O O O
	Iron (III) chloride	50	O O O	- - -	O O O	O O O	O O	O O	O O O
Basic salt	Sodium sulfite	sat.	O O O	O O O	- - -	O O O	O O	O O	O O O
	Sodium carbonate	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
Neutral salt	Potassium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Sodium sulfate	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
	Calcium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Sodium chloride	sat.	O O O	X X X	O O O	O O O	O O	O O	O O O
	Sodium nitrate	50	O O O	X X X	O O O	O O O	O O	O O	O O O
	Aluminium chloride	sat.	O O O	- - -	O O O	O O O	O O	O O	O O O
Oxidizing agent	Hydrogen peroxide	30	O O O	O O O	O O O	O O O	O O	O O	O O O
	Sodium hypochloride	50	O O O	X X X	O O X	O O O	X X	X X	O O O
	Potassium dichromate	sat.	O O O	O O O	O O O	O O O	O O	O O	O O O
	Chlorinated lime		O X -	X X X		X X X	- -	O O	O O O
Organic solvent	Ethanol	80	O O X	O O O	X - -	O O O	O O	O X	O O O
	Cyclohexane		O O X	O O O	O O O	O O O	- -	O O	O O O
	Toluene		O O O	O O O	- - -	O O O	X -	- -	O O O
	Trichloroethane		X X X	O O X	X X X	O O O	- -	- -	O O O
	Water		O O O	O O O	O O O	O O O	O O	O O	O O O

O = can be used, X = shortens useful life, - = cannot be used

Note: Information in this list is based on our general experience and literature data and given in good faith. However Yokogawa is unable to accept responsobility for claims related to this information.

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